
Prevalence of sunless tanning product use and related behaviors among adults in the United States: Results from a national survey

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Little is known about the use of sunless tanning products in the United States. This report describes the prevalence and correlates of sunless tanning use, comparing exclusive sunless tanners, exclusive indoor tanners, both sunless and indoor tanners, and non-tanners with respect to sociodemographic and sun protection behaviors. (J Am Acad Dermatol 2007;56:387-90.)

Sunless tanning products have become increasingly popular. Although they are considered generally safe to use, there are concerns that sunless tanning products users may also be increasing their exposure to harmful ultraviolet radiation (UVR), either through sun exposure or indoor tanning devices. Some sunless tanning products contain sunscreen, although most do not indicate any sun protection factor.¹ The darkened skin color achieved with sunless tanning products, along with sunscreen ingredients when they are included, may create a false sense of protection from UVR. Subsequently, users of sunless tanning products may be less inclined to practice safe sun behaviors. Many tanning salons now offer both sunless tanning and UVR tanning beds at the same locations,² increasing the ease of using both methods. However, while national rates of adult indoor tanning have been estimated,³ the extent to which individuals utilize both types of services is unknown.

Some sun protection interventions have included sunless tanning products as an alternative to UVR exposure, and these studies have demonstrated that

including sunless tanning products did not increase exposure to UVR.^{4,5} A recent pilot survey conducted with 121 individuals who had undergone spray-on sunless tanning treatment revealed that most respondents reported that they would not change their time spent in the sun or sunscreen use as a result of using sunless tanning. However, 73% of those who had reported using tanning beds stated that they had or would decrease tanning bed use.⁶

A survey conducted among South Australian adults found that sunless tanners were more likely to use sunscreen but less likely to wear hats and other protective clothing than non-users. Sunless tanning use was also associated with repeated sunburns.⁷ Little is known about sunless tanning product use in the United States. The current study utilizes data from the National Cancer Institute's Health Information National Trends Survey (HINTS 2005), and reports the first US national-level information on sunless tanning, and seeks to understand how sunless tanning relates to indoor tanning and sun protection behaviors.

METHODS

Data came from HINTS 2005 (collected between February and August 2005; N = 5491 complete interviews). The sample design was a list-assisted, random digit dial (RDD) telephone survey of all US telephone exchanges. The final response rate for the survey, including an initial screening for eligibility and an extended interview, was 20.9%. Responses were weighted to produce a representative sample of adults living in the United States. A detailed report about the sample and sampling design is published elsewhere.⁸

Measures

Sociodemographic. Information was collected on, age, education, race/ethnicity, income, and geographic region.

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Table I. Tanning by demographic variables

	% No tanning (95% CI)	% Sunless only (95% CI)	% Indoor only (95% CI)	% Both (95% CI)
Gender	N = 4606	N = 506	N = 262	N = 140
Male	91.1 (89.2, 92.7)	3.7 (2.7, 5.2)	4.2 (2.8, 6.4)	.9 (.5, 1.8)
Female	76.6 (74.8, 78.2)	12.2 (10.9, 13.7)	6.4 (5.3, 7.7)	4.9 (4.0, 5.9)
		$\chi^2 = 154.43, P < .001$		
Age (based on quartile split)	N = 4601	N = 506	N = 262	N = 139
18-34	78.9 (75.8, 81.8)	6.9 (4.8, 9.7)	9.5 (7.1, 12.5)	4.7 (3.6, 6.2)
35-39	80.30 (75.5, 84.4)	10.5 (7.3, 15.0)	5.4 (3.4, 8.3)	3.8 (2.2, 6.5)
40-44	78.8 (73.6, 83.2)	10.6 (7.7, 14.4)	6.3 (3.4, 11.4)	4.3 (2.5, 7.3)
45+	88.2 (86.9, 89.3)	8.0 (7.0, 9.1)	2.5 (1.9, 3.2)	1.4 (1.0, 1.9)
		$\chi^2 = 97.67, P < .001$		
Education	N = 4485	N = 492	(N = 256)	N = 137
< High school	91.1 (87.5, 93.8)	4.1 (2.3, 7.3)	2.3 (1.3, 4.3)	2.4 (1.2, 4.8)
High school	84.7 (82.3, 86.9)	8.1 (6.6, 9.8)	4.3 (2.8, 6.6)	2.9 (2.0, 4.3)
Some college	78.4 (75.8, 80.7)	9.1 (7.3, 11.3)	8.3 (6.4, 10.8)	4.2 (3.1, 5.7)
College	84.6 (82.4, 86.5)	9.0 (7.5, 10.7)	4.6 (3.6, 5.9)	1.9 (1.3, 2.8)
		$\chi^2 = 62.06, P < .001$		
Race	N = 4448	N = 491	N = 255	N = 136
Hispanic/Latino	88.9 (84.7, 92.0)	7.6 (5.1, 11.4)	23 (1.1, 4.5)	1.3 (.5, 3.5)
Non-Hispanic	80.8 (79.2, 82.2)	9.0 (8.0, 10.2)	6.6 (5.3, 8.1)	3.7 (3.0, 4.5)
White				
Non-Hispanic	92.8 (86.4, 96.3)	4.1 (2.2, 7.7)	2.7 (.5, 13.1)	.4 (.1, 3.0)
Black				
Non-Hispanic	88.5 (83.1, 92.3)	5.6 (3.1, 10.0)	2.9 (1.1, 7.8)	3.0 (1.3, 7.0)
Other				
		$\chi^2 = 113.35, P < .001$		
Income	N = 3818	N = 418	N = 229	N = 131
<25 K	89.9 (86.7, 91.7)	5.3 (3.7, 7.4)	2.7 (1.9, 3.8)	2.6 (1.6, 4.2)
25-35 K	89.6 (85.6, 92.6)	4.8 (2.8, 8.1)	3.7 (2.1, 6.2)	2.0 (1.1, 3.6)
35-50 K	83.5 (77.7, 88.0)	7.6 (5.0, 11.4)	6.6 (3.7, 11.5)	2.3 (1.3, 4.2)
50-75K	81.1 (77.5, 84.3)	9.0 (6.9, 11.7)	6.3 (4.6, 8.5)	3.6 (2.4, 5.2)
≥ 75 K	76.6 (72.5, 80.2)	10.5 (8.9, 12.4)	8.1 (5.4, 12.0)	4.9 (3.3, 7.0)
		$\chi^2 = 58.36, P < .001$		
Region	N = 4606	N = 506	N = 262	N = 140
Northeast	88.0 (85.3, 90.2)	5.3 (4.0, 6.8)	3.9 (2.5, 6.0)	2.9 (1.6, 5.2)
Midwest	79.5 (76.2, 82.6)	7.4 (5.6, 9.7)	8.8 (6.3, 12.1)	4.3 (2.9, 6.3)
South	84.6 (82.7, 86.3)	8.3 (6.8, 9.9)	4.6 (3.5, 6.0)	2.6 (1.8, 3.7)
West	82.7 (79.6, 85.5)	10.7 (8.7, 13.1)	4.2 (2.3, 7.4)	2.4 (1.4, 4.0)
		$\chi^2 = 44.66, P < .01$		

Indoor and sunless tanning. Respondents were asked about their use of “indoor tanning devices, such as a sun lamp, a sun bed, or a tanning booth” and “sunless tanning products” in the past 12 months (0, 1-2, 3-10, 11-24, or 25+ times). They were characterized as “exclusive sunless tanners,” “exclusive indoor tanners,” “both sunless and indoor tanners,” or “neither sunless nor indoor tanners” (non-tanners).

Sun protection behaviors. Respondents were asked how often they wear “sunscreen,” “a hat that shades your face, ears, and neck,” “a long-sleeve

shirt,” and “long pants,” as well as “stay in the shade” when outside for more than 1 hour on a warm day (1 = always, 5 = never). All items were reverse scored for analyses.

Analysis

All analyses were weighted to provide estimates for the adult population of the United States, with jackknife variance weights used to make adjustments for non-response. Descriptive statistics on tanning variables provided the frequency of sunless and

Table II. Weighted means* of sun protection practices, with a Bonferonni adjustment for multiple tests

	Mean no tanning (SE)	Mean sunless only (SE)	Mean indoor only (SE)	Mean both (SE)
Sunscreen	2.58 (.03) [†]	2.92 (.08) ^{†,‡}	2.40 (.15) [‡]	2.57 (.18)
Shade	3.38 (.02) ^{†,§,}	3.15 (.08) ^{†,‡}	2.83 (.14) ^{§,‡}	2.76 (.13)
Hat	2.80 (.03) [§]	2.96 (.09) [‡]	2.31 (.11) ^{§,‡}	2.61 (.15)
Long shirt	2.23 (.03) [§]	2.23 (.07) [‡]	1.81 (.07) ^{§,‡}	1.99 (.14)
Long pants	3.34 (.03) ^{§,}	3.27 (.08) [‡]	2.68 (.10) ^{§,‡}	2.93 (.13)

*Responses range from 1 to 5, controlling for gender, age, education, race, income, and region of the country.

[†]No tanning and sunless only significantly different at $P < .008$.

[‡]Sunless only and indoor only significantly different at $P < .008$.

[§]No tanning and indoor only significantly different at $P < .008$.

^{||}No tanning and both significantly different at $P < .008$.

indoor tanning. Cross-tabulation tables with χ^2 tests of statistical significance examined relationships between tanning status and sociodemographic variables. Regressing each of the five sun safety behaviors on the set of sociodemographic variables and the tanning variable, adjusted means of sun safety behaviors by tanning group status were assessed for differences using t tests. Using a Bonferroni adjustment for multiple comparisons, the level for statistical significance was set at $P < .008$ (comparing each group within the tanning variable produced 6 comparisons). SUDAAN (University of Texas at Austin, Austin, Tex) was used to calculate variances of parameter estimators using a jackknife method.⁹

RESULTS

Frequent use of sunless tanning products is uncommon. Of the estimated 11% of US adults who report using sunless tanning products in the past year ($N = 646$), 13% (95% CI: 10, 17) reported using the products more than 25 times; 12% (95% CI: 9, 15) between 11 to 24 times; 35% (95% CI: 30, 41) 3 to 10 times, and 40% (95% CI: 35, 46) 1 to 2 times.

Table I provides the distribution of the tanning variable by sociodemographic variables. Compared to respondents who reported recent exclusive use of UVR tanning devices, or both UVR devices and sunless tanning products, recent exclusive sunless tanners tended to be older and more educated. Exclusive sunless tanning was most prevalent in the West, whereas exclusive indoor tanning, or combined sunless and indoor tanning, was more common among respondents from the Midwest.

Table II provides the weighted means for five sun protection practices, controlling for sociodemographic variables. Compared to non-tanners, exclusive sunless tanners were significantly more likely to use sunscreen, and significantly less likely to seek shade, but there were no significant differences between the two groups for the use of protective clothing, including wearing a hat, a long shirt, or

long pants. In contrast, exclusive sunless tanners were significantly more likely than exclusive indoor tanners to practice all five sun protection behaviors. Exclusive sunless tanners had higher behavioral scores than the mixed group, but these differences were not significant at the $P < .008$ value. Finally, while there was no statistically significant difference between exclusive indoor tanners' and non-tanners' use of sunscreen, indoor tanners were significantly less likely than non-tanners to practice the other four sun protection behaviors.

DISCUSSION

In this report of the prevalence of the use of sunless tanning products and related UVR exposure and protection practices of adults in the United States, we found that just over 10% use these products, and fewer than 3% percent used them more than 10 times in the past year. Users and exclusive users in particular are more likely to be women, older, living in the West, and with higher levels of education. Sunscreen use appears to be highest among users of sunless tanners, but their practice of other sun protection behaviors, compared to non-tanners, is less clear.

Some findings from this study are different from results of surveys conducted in Australia in 1999 and 2000.^{7,10} The Australia surveys found that sunless tanners were more likely than non-tanners to use sunscreen and less likely to practice other safe sun behaviors; this report is consistent with findings for sunscreen use and seeking shade, but not for protective clothing. Part of the discrepancy may be explained by the distinction between exclusive sunless tanners and sunless tanners who also frequent indoor tanning salons, and who appear to be less concerned about the harmful effects of UVR.

Though limited in the strength and nature of our conclusions by the use of an existing dataset with a poor response rate and by a lack of sun sensitivity or tanning attitude measures, this study provides an

important baseline indicator of the use of sunless tanners in relation to UVR exposure behaviors—both outdoors and through artificial sources, and to sun protection practices. The results of this study suggest the utility of distinguishing between exclusive sunless tanners and those who also frequent ultraviolet indoor tanning salons. Continued surveillance of these practices, their correlates, and other tanning-related variables not assessed on the HINTS survey is warranted.

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REGISTRATION OF CLINICAL TRIALS

The *Journal of the American Academy of Dermatology* strongly encourages prospective registration of clinical trials with a registry that follows the guidelines set forth by the ICJME in September 2004, such as <http://www.clinicaltrials.gov>.¹ At some point in the future, we will require evidence of registration with all submissions. Notification of this change and the timeline for implementing this requirement will be published in the *JAAD* and will be incorporated into the Instructions to Authors to allow investigators adequate time to respond.

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